CLAIMS:

1-12. (cancelled).

13. (withdrawn) An apparatus for forming a nitrogen compound semiconductor substrate, the apparatus comprising:

a reacting chamber for forming a single crystalline nitride film on a parent substrate;

a heating chamber connected to the reacting chamber within a processing channel, wherein the single crystalline nitride film is separated from the parent substrate by laser beam illumination at a higher temperature than a room temperature; and

a supporter for supporting the single crystalline nitride film and the parent substrate and maintaining the single crystalline nitride film in a predetermined temperature.

14. (withdrawn) The apparatus as recited in claim 13, wherein the apparatus is a hydride vapor phase epitaxy apparatus.

15. (withdrawn) The apparatus as recited in claim 13, wherein the predetermined temperature is in a range of 600 °C to 1000 °C.

16. (withdrawn) The apparatus as recited in claim 13, wherein the apparatus further comprises an exhausting chamber positioned between the reacting chamber and the heating chamber, and wherein each of reacting, exhausting and heating chambers is isolated from each other by shutters.

17. (cancelled).

18. (amended) A method for forming a nitrogen compound semiconductor substrate, the ~~The~~ method ~~as recited in claim 17, further~~ comprising the steps of:

a) preparing a parent substrate;

b) forming a single crystalline nitride film on the parent substrate in a reacting chamber;

c) moving the parent substrate on which the single crystalline nitride film is formed into a heating chamber that is connected to the reacting;

d) moving onto a supporter the parent substrate, wherein the supporter is positioned in the heating chamber;

e) heating the parent substrate up to a predetermined temperature which is higher than a room temperature;-and

~~f) moving onto a supporter the parent substrate on which the single crystalline nitride film is formed, wherein the supporter is positioned in a heating chamber which is connected to the reacting chamber within a processing channel.~~ while the single crystalline nitride film is at about the predetermined temperature that is higher than the room temperature, illuminating a laser beam on a backside of the parent substrate and separating the single crystalline nitride film from the parent substrate.

19. (amended) The method as recited in ~~claim 17,~~ claim 18, wherein the parent substrate is selected from one of sapphire ($A1_2O_3$), spinel ($MgA1_2O_4$) or silicon carbide (SiC).

20. (amended) The method as recited in ~~claim 19,~~ claim 18, wherein the single crystalline nitride film is formed by a hydride vapor phase epitaxy.

21. (amended) The method as recited in ~~claim 19,~~ claim 18, wherein the step b) comprises the steps of:

a1) positioning a material selected from a group III at a first temperature region of 600 °C to 900 °C in the reacting chamber and positioning the parent substrate at a second temperature region of 1000 °C to 1100 °C in the reacting chamber;

a2) injecting a nitrogen gas into the reacting chamber;

a3) injecting a hydrochloric acid gas into the reacting chamber; and

a4) injecting an ammonia gas into the reacting chamber.

22. (amended) The method as recited in ~~claim 9,~~ claim 18, wherein the parent substrate is heated up to 600 °C to 1000 °C.

23. (amended) The ~~apparatus~~ method as recited in ~~claim 21,~~ claim 18, wherein ~~the apparatus further comprises~~ an exhausting chamber is positioned between the reacting chamber and the heating chamber, and wherein ~~each of~~ the reacting, exhausting and heating chambers ~~is~~ are isolated from each other by shutters.

24. (cancelled).

Amendments to the Specification

Please replace the first paragraph under the heading Background Art (specification page 1) with the following amended paragraph:

A GaN single crystalline substrate, as an example of a single crystalline nitride substrate, will be described. Generally, the GaN materials has a melting point more than of 2400 and the dissociation pressure of nitride in the GaN materials is about ten thousand atmospheres ~~atm~~. Accordingly, this high melting point and high dissociation pressure make it impossible to create a large single crystalline GaN bulk using typical growing methods of the semiconductor crystals. A needle-shaped crystal growing method, in which a gallium gas directly reacts on an ammonia gas at a high temperature of about 1000 °C to 1150 °C , and a plate-shaped crystal growing method, in which nitrogen is dissolved in liquid gallium at a high temperature of about 1500 °C to 1600 °C and at a high nitrogen pressure corresponding to about 20000 atmospheres ~~atm~~, has been used to create a single crystalline GaN bulk (hereinafter, referred to as a GaN bulk).

Please replace the first paragraph under the heading Best Mode For Carrying Out The Invention (specification page 5) with the following amended paragraph:

Referring to Fig. 3, a horizontal~~ity~~-type hydride vapor phase epitaxy apparatus of an atmospheric pressure is shown in order to form a single crystalline nitride substrate. The hydride vapor phase epitaxy apparatus includes a reacting chamber 11A in which a quartz boat (not shown) is placed, a heating chamber 11C having a supporter 40 to maintain a specimen, and an exhausting chamber 11B positioned between the reacting chamber 11A and the heating chamber 11C and coupled to an exhausting system 16. The temperature of the supporter 40 in the heating chamber 11C is maintained in a specific

temperature range and laser beam illumination to separate a single crystalline nitride film from a parent substrate 30 is carried out in the heating chamber 11C. Further, each of the chambers 11A to 11C adjacent to the exhausting chamber 11B is sealed up with shutters 12 and flanges 12A are mounted on both ends of the chambers 11A and 11C. Conventional mechanisms may be used to position and move specimens and quartz boats in the chambers.

Please the first full paragraph on page 6 of the specification with the following amended paragraph:

The reacting chamber 11A is surrounded by a multi-step electric furnace 13 and is connected to a first inlet 14 to supply an ammonia gas and a second inlet 15 to supply hydrochloric acid and nitrogen gases. These gases react on Ga materials 20 within the reacting chamber 11A and then a thick GaN film is deposited on the parent substrate 30 adjacent to the Ga materials 20. While the thick GaN film is grown in the reacting chamber 11A, the reacting gases are purged away through the exhausting system 16 in the exhausting chamber 11B and when the growth of the single crystalline nitride substrate (the think GaN film) has been finished, the reacting chamber 11A is isolated from the exhausting chamber 11B by the shatter 12. The parent substrate 30 on which the thick GaN film is formed is removed onto the supporter 40 in the heating chamber 11C without being exposing to air and laser beam is illuminated on the backside of the parent substrate 30 at a temperature of about 600 °C to 1000 °C to separate a single crystalline GaN film (think GaN film) from the parent substrate 30. It should be noted that the thick GaN film and the parent substrate 30 are not cooled down to a room temperature.

Please replace the second full paragraph on page 8 of the specification with the following amended paragraph:

Referring to Fig. 4C, when the temperature of the reacting chamber 11A reaches to 600 °C to 1000 °C, the parent substrate 30 on which the thick GaN film 31 is formed is moved into the supporter 40 in the heating chamber 11C. At this time, the temperature of supporter 40 is maintained at about 600 °C to 1000 °C and the bottom of the parent substrate 30 is turned over top so that the thick GaN film 31 is directly on the

supporter 40. The turned upside of the parent substrate 30 is illuminated by laser beam (50). It should be noted that the thick GaN film 331 and the parent substrate 30 are not cooled down to a room temperature.

Amendments to the Drawings

The attached sheet of drawing replaces the previously submitted sheet for FIG. 1. A legend "Prior Art" is now included in FIG. 1

REMARKS

Summary of Office Action

Claims 13-24 were pending in the above-identified patent application. Of these claims 13-16 were withdrawn from consideration as drawn towards a non-elected invention.

Claims 17, 19, 20, 22, and 24 were rejected under 35 U.S.C. § 103(a) as being obvious from Itoh et al. U.S. Patent No. 6,218,207 B1 ("Itoh") in view of Kelly et al., "Large Free-Standing GaN Substrates by Hydride Vapor Phase Epitaxy and Laser-Induced Liftoff" Japanese J. Appl. Phys., Vol. 38 (1999) ("Kelly"), and Wong et al., "Damage Free Separation Of Thin GaN Thin Film From Sapphire Substrates" Applied Physics Letters Vol. 72, no. 5, Feb. 2, 1998 ("Wong"). Claims 18, 21, 23 were found to have allowable subject matter, but were objected to as being dependent upon a rejected base claim.

The Examiner also pointed out informalities in the drawings and the specification.

Applicant's Reply

Applicant thanks the Examiner for pointing out informalities in the drawings and the specification. To correct these informalities, applicant has amended FIG. 1 to include the legend "Prior Art". Further, applicant has amended the specification to spell out the full word "atmospheres" replacing the previously used abbreviation "atm" (twice), and included a description of the complete set of numbered elements in FIGS. 3 and 4c.

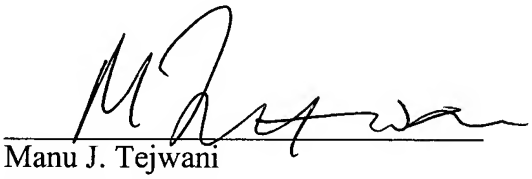
Applicant appreciates Examiner's indication of allowable subject matter in claims 18, 21 and 23.. Applicant has cancelled claims 17 and 24 without prejudice.

Claim 18 has been rewritten in independent form (including all of the limitations of the cancelled base claim 17) so that it is in proper form for allowance. Claims 19-23 have been amended so that they now depend from claim 18. Accordingly, they are also now in proper form for allowance.

Conclusion

The foregoing demonstrates that claims 18 -23 are in condition for allowance. Prompt allowance of this application is respectfully requested.

Respectfully submitted,



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